

**CLAIMS**

1. A control system for controlling the movement of a piston (10) in a fluid-pumping device (1), the piston (10) being displaceable in a block (5) of the fluid-pumping device (1) and being driven by a motor (2) fed by a voltage (V), the system comprising:
  - a semiconductor electronic device (T) having an outlet ( $S_G$ ) and an inlet (G), the semiconductor electric device (T) cyclically applying the voltage (V) to the motor (2) to drive the piston (10);
  - 10 - a resistive element (Rb);
  - a capacitive element (Cy);
  - a piston-position sensor (S) to indicate the passage of the piston (10) by a point (R) at the block (5) of the fluid-pumping device (1); and the system being characterized by:
- 15 - the capacitive element (Cy) being electrically connected to the semiconductor device (T) between and re-feeding the outlet ( $S_G$ ) and the inlet (G), the capacitive element (Cy) triggering the semiconductor electronic device (T) to apply the voltage (V) to the motor (2);
  - the capacitive element (Cy) being charged by means of the resistive element (Rb) at each cycle of application of voltage (V) to the motor (2), the capacitive element (Cy) being discharged, at least partly, when the piston (10) passes by the point (R) and delaying the trigger point of the semiconductor electronic device (T) in a subsequent cycle proportionally to the time of passage of the piston (10) by the point (R).
- 20 2. A control system according to claim 1, characterized in that the semiconductor electronic device (T) is self-fed by the voltage (V).
3. A control system according to claim 1, 2, or 3, characterized by additionally comprising a triggering semiconductor electronic device ( $T_1$ ) electrically connected with the inlet (G) and with the capacitive element (Cy) and resistive element (Rb).
- 30 4. A control system according to any one of claim 1 to 3, characterized in that the electronic device comprises a bidirectional power switch

**BEST AVAILABLE COPY**

(T).

5. A control system according to any one of claim 1 to 4, characterized in that the sensor (S) is electrically connected with the entry (G) of the device (T).

5 6. A control system according to claim 5, characterized in that the device (T) is actuated by a semiconductor electronic device (T1).

7. A control system according to claim 6, characterized in that the position sensor (S) includes a contact element (Sp) for contact with the piston (10).

10 8. A control system according to claim 7, characterized in that the position sensor (S) includes an inductive element (Li).

9. A control system according to claim 8, characterized in that the inductive element (Li) is electrically connected with a semiconductor device (T<sub>2</sub>).

15 10. A method of controlling the movement of a piston (10) in a fluid-pumping device (1), the piston (10) being displaceable in a block (5) of the fluid-pumping device (1) and being driven by a motor (2) fed by a voltage (V), the method comprising the steps of:

20 - charging a capacitive element (Cy) by means of a resistive element (R<sub>b</sub>),  
- monitoring the movement of the piston (10) by means of a position sensor (Sp, Li), and  
the method being characterized by:

25 - maintaining the charge level of the capacitive element (Cy) until the position sensor (Sp, Li) has detected the passage of the piston (10) by a predetermined point (R) at the block (5), and discharging, at least partly, the capacitive element (Cy).

11. A method according to claim 10, characterized in that, after the step of discharging, the capacitive element (Cy) is again charged.

30 12. A method according to claim 10 or 11, characterized in that, in the step of monitoring the movement of the piston (10), a contact element (Sp) is actuated.

13. A method according to claim 10 or 11, characterized in that, in the monitoring step, an inductive element (Li) is actuated.

14. A fluid-pumping device (1) comprising a piston (10) displaceable in a block (5), the piston (10) being driven by a motor (2) fed by a voltage (V), and comprising a circuit (30, 40) having a semiconductor electronic device (T), a resistive element ( $R_B$ ), a capacitive element (Cy) and a piston-position sensor (S) to indicate the passage of the piston (10) by a point (R) at the block (5);

the device (1) being characterized by comprising:

10 - the resistive element ( $R_B$ ) and the capacitive element (Cy) being electrically connected with the semiconductor electronic device (T), refeeding an outlet and an inlet (G) of the latter;

15 - the capacitive element (Cy) being charged by means of the resistive element ( $R_B$ ) and being discharged, at least partly, when the piston (10) passes by the point (R).

16. A device according to claim 14, characterized in that the circuit (30, 40) is self-fed.

17. A device according to claim 14 or 15, characterized in that the electronic device comprises a bidirectional power switch (T).

20 18. A device according to claim 14, 15, or 16, characterized in that the position sensor (S) includes a contact element (Sp) for contact with the piston (10).

19. A device according to claim 14, 15, or 16, characterized in that the position sensor (S) includes an inductive element (Li).